

SUBJECT FILE COPY

52-3924

## ROUTING AND RECORD SHEET

SUBJECT: (Optional)

Powerhouse Boiler Tubes

45-18

FROM:

C/NBPO/OL  
1J45 HQ

EXTENSION

NO.

DATE

13 Nov 85

TO: (Officer designation, room number, and building)

DATE

RECEIVED

FORWARDED

OFFICER'S INITIALS

COMMENTS (Number each comment, show from whom to whom. Draw a line across column after each comment.)

1. DDA/EXO  
7D18 HQ

14 NOV

EJA

Mr. Fitzwater,

2. Acting ADDA

seen

11/18/85

Some time ago, you indicated some concern for the condition of the boiler tubes in the existing boilers. As a result of this inquiry, I had samples cut from the tubes and analyzed by an independent laboratory.

3. DDA

15 NOV  
1985

D

Attached is the result of this testing which is self-explanatory. If you wish any further information on this matter, please let me know.

4.

5. C/N13 PD

6.

7.

8.

9.

10.

11.

12.

13.

14.

15.

Attachment

3-5

I wonder why I was told that two of the boilers had to be retubed because of deterioration resulting from GSA not using boiler compound?



General National  
Services Capital  
Administration Region Washington, DC 20407

Date : November 11, 1985  
Reply to : Arthur J. Carlucci, GSA Project Manager  
Attn of :  
Subject: GS-11B-19067, Bid Package No. 3, Powerhouse Modifications, Evaluation Report for Boiler Tube Samples on Boiler #3, CE #84  
STAT :  Chief  
New Building Project Office

Subsequent to Mr. Fitzwater's question about the condition of the boiler tubes in the existing boilers at the powerhouse, we authorized Mechanical Constructors Incorporated (MCI) to remove four complete tubes from the boiler and analyze section cut from the tubes.

The evaluation or test report by an independent laboratory on the eight cut-sections is attached hereto for your review and records.

All in all, the report would appear to indicate that other than some cleaning of the exterior and the interior surfaces of the tubes, no other action need be considered at this time.

A handwritten signature in dark ink, appearing to read 'Arthur J. Carlucci'.

ARTHUR J. CARLUCCI  
Project Manager  
Headquarters Expansion Project

AJC:nj

Attachment: Comp. Report

cc: Gary Lee  
Paul Moran  
CO File CE #84

**Area Code: 703  
569-8010**

By: Roy Mahyles  
Roy Mahyles  
Project Estimator

AK 11-9-85



31 SHERIDAN STREET, N.W., WASHINGTON, D.C. 20011 (202) 682-7474

October 22, 1985

MCI Contractors Inc.  
P.O. Box 340  
Mc Lean, Va. 22101

Attn: Mr. Bill Johnson

Dear Mr. Johnson,

On Monday, October 21, 1985 we reported to you on the condition of the boilers at the CIA power plant. Overall, the condition was quite good. And, if the present trend continues, we project extended servicability.

I want to reinforce the concern of our lab with respect to boiler cleaning. We did detect some "Tramp" copper in this system. As such, special note should be taken when and if you decide to clean these boilers. We recommend that you inform the cleaning contractor of our findings so that the proper precautions may be exercised.

We are making this recommendation not to alarm, only to inform. Again, we emphasize that overall, the condition is good.

If we may be of further assistance, please let us know.  
Thanks again for the opportunity.

Very truly yours,  
Olin Corporation  
Olin Water Services

*Mac Sholas*

Mac Sholas  
Branch Manager

Copy: Tony Romiti

AJC 11-9-85



31 SHERIDAN STREET, N.W., WASHINGTON, D.C. 20011 (202) 862-7474

October 21, 1985

MCI Contractors Inc.  
P.O. Box 340  
Mc Lean, Va. 22101

Attn: Mr Bill Johnson

Dear Mr. Johnson,

The attached report is an official one from our Metals Research Laboratory located in New Haven, Connecticut. The evaluation that was conducted was completed to the degree necessary to provide you with an overview of the history of your equipment. As we discussed with your Mr. Roy Mahyles, the report chronicles the conditions of those tubes inspected, only. From there we were able to extrapolate what we feel is a good estimate of the entire system.

\* In summarizing the overall condition, Dr. Sheldon found that at the present time, retubing would be unnecessary. Based on the accepted methodology of water treatment, we concur. With a proper treatment program, we feel that the tube condition is such that we need only to continue periodic checks.

If you find that you need any other verification, please let us know.

Thanks to you and your staff for allowing us to work with you.

Very truly yours,  
Olin Corporation  
Olin Water Services

*Mac Sholas*

Mac Sholas  
Branch Manager

# INTER OFFICE MEMO

WC 11-9-85

TO N. W. Polan 18H2  
 FROM G. P. Sheldon AT 18H4  
 SUBJECT Evaluation of Boiler Tubes Submitted  
by Olin Water Services

October 16, 1985  
 DATE J. Winter  
 COPY TO J. E. Oxley  
M. Sholas

At the request of Olin Water Services, sections of tubing from an oil fired boiler were examined and their general condition evaluated. The boiler contains vertical tubes of two different diameters, 3.25" O.D. x .180" wall and 2.5" O.D. x .150" wall, in which the water runs from bottom to top. The tube material is reported to meet specification FA-178A, which is believed to be the same as ASTM specification A179 for electric-resistance-welded carbon steel boiler tube. The boiler has been in service since 1960 to the present time, and there have apparently been no tube failures over this period.

✓ Two sections from four tubes, one from the bottom and one from the top of each tube, were examined. Two of the tubes (designated right wall and front wall) were 3.25" O.D. tubes, the other two (designated right target wall and left target wall) were 2.5" O.D. tubes. In all cases the outer tube surface was covered with a thick brown scale which was easily removed in a detergent water solution. The base metal beneath the scale appeared to be unattacked, and the outer diameters of the two tube types were found to be equal to their initial values (i.e. 3.25" and 2.50" respectively), indicating little or no corrosion of the outer surface.

Each of the sections was cut in half longitudinally and the inner surface examined. The surfaces of all the tubes were covered with a red/orange colored scale which was hard and tenacious. In general the scale in those sections from the top of the tubes was smooth and continuous, where as the scale from the bottom sections was rough and discontinuous. The scale was not water soluble and required immersion in a heated, organic inhibited, 10% HCl solution for periods of from 45 to 60 minutes to remove the scale. After cleaning in this solution a copper color deposit was found on the tube surface. Apparently the scale contains some copper compounds, most likely from the copper tubing in the heating system, which after dissolution in the acid solution deposited on the steel tube. As a copper compound in the scale it would not have any adverse affect on the tube, however, if the tubes are acid cleaned, deposition of copper on the clean steel surface may accelerate corrosion when the boiler is put back in operation. Cleaning techniques are available that insure that copper formation on the tube surface does not occur.

ANC 11-9-85

The tube surfaces beneath the scale appeared to have undergone uniform corrosion with evidence of some pitting located randomly over the surface. There was no evidence to suggest that areas where the scale had broken away were areas where pitting occurred. Wall thickness measurements indicated that there had been a loss of the wall in both tube types based on the given initial thickness of the tubes, as shown in Table I. The minimum wall thickness is the amount of wall remaining at the bottom of the deepest pit found. In the 3.25" O.D. tube the minimum wall thickness found (i.e. at a pit) was .076" indicating that approximately 40% of the wall remained, in the 2.5" O.D. tube the minimum thickness was .08", or approximately 50% of the wall remained. It should be noted that the surfaces examined constitute only a small fraction of the total surface area in the boiler, therefore areas may exist on other tubes where more severe pitting has occurred.

\* The loss in wall thickness observed here is not considered unusual after a 25 year service period, since corrosion rates of less than 5 mil/year are generally considered acceptable for most materials. Presence of pitting though not desirable is not uncommon. If these samples are representative of the tubes remaining in the boiler, then imminent retubing appears to be unnecessary. An estimate of remaining service life is more difficult to predict and would depend on the assumption of linearly extrapolated corrosion rates and on the mechanical properties of the reduced wall tubing.



G. P. Sheldon

cam

TABLE I

WALL THICKNESS OF VARIOUS BOILER TUBE SECTIONS

<u>TUBE</u>	<u>O.D.(in)</u>	<u>Original WALL(in)</u>	<u>Average WALL(in)</u>	<u>Miminum WALL(in)</u>
Right Wall Top	3.25	.180	.122	.099
Right Wall Bottom	3.25	.180	.110	.076
Front Wall Top	3.25	.180	.122	.102
Front Wall Bottom	3.25	.180	.120	.103
Left Target Wall Top	2.50	.150	.113	.10
Left Target Wall Bottom	2.50	.150	.101	.08
Right Target Wall Top	2.50	.150	.111	.10
Right Target Wall Bottom	2.50	.150	.102	.087